

## *Musa azizii*, a New *Musa* Species (Musaceae) from Northern Borneo

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A new wild banana species, *Musa azizii* Häkkinen, is described and illustrated. The species is extremely rare, originating in the Lumut Range area of Sarawak, East Malaysia.

Key words: Borneo, *Callimusa*, *Musa*, *Musa acuminata*, *Musa azizii*, *Musa borneensis*, *Musa hirta*, *Musa muluensis*, wild banana.

Borneo has a large number of wild banana species. In 1902 an Italian botanist Dr. Odoardo Beccari was the first who described wild bananas from Borneo based on his studies in Sarawak during the period of 1865-68 (Beccari 1902). These descriptions were republished in Webbia (Martelli 1923). He described and named four species: *Musa borneensis* Becc., *M. campestris* Becc., *M. hirta* Becc. and *M. microcarpa* Becc. In 1967 Prof. Mitsuru Hotta described three new species, *M. flavida* M. Hotta., *M. muluensis* M. Hotta. and *M. tuberculata* M. Hotta based on his expeditions in Sabah Brunei and Northern Sarawak 1963-4 and mentioned "The number of the wild species of *Musa* in Borneo may count more than 10 or even 20, though only 5 species have been described up to present" (Hotta 1967). Simmonds, who never visited in Borneo, described *M. beccarii* Simmonds from a cultivated plant in Trinidad, which he grew from seeds imported from Sabah (Simmonds 1960). In 2000 Dr. George Argent from Royal Botanical Garden, Edinburgh described *M. monticola* [Hotta ex] Argent and *M. suratii* Argent from Sabah (Argent

2000). Then the author described five varieties of *M. campestris* Becc., i.e., var. *lawasensis* Häkkinen, var. *limbangensis* Häkkinen, var. *miriensis* Häkkinen, var. *sabahensis* Häkkinen, var. *sarawakensis* Häkkinen and gave notes for the var. *campestris* (Häkkinen 2003). Then the author described *M. voonii* Häkkinen (Häkkinen 2004) and *M. bauensis* Häkkinen & Meekiong (Häkkinen & Meekiong 2004). These author's descriptions are based on the expeditions in 2001, 2002 and 2004 in Borneo. With the discovery of the new described species *M. azizii*, the number of native *Musa* species in Borneo has increased to 15 excluding *M. textilis* Nee, which is an introduction in Borneo from the Philippines (Bishop & Curtler 1925, Marsh 1947).

This paper is based on field observations made by the author during an expedition to Sarawak in spring 2004 and describes a new species *Musa azizii*, which is placed in sect. *Callimusa* based on its distinctive morphology (Häkkinen 2004).

This species is described based on living plants in the field by completing the entire INIBAP *Musa* Descriptor List (IPGRI-INIBAP/CIRAD 1996).

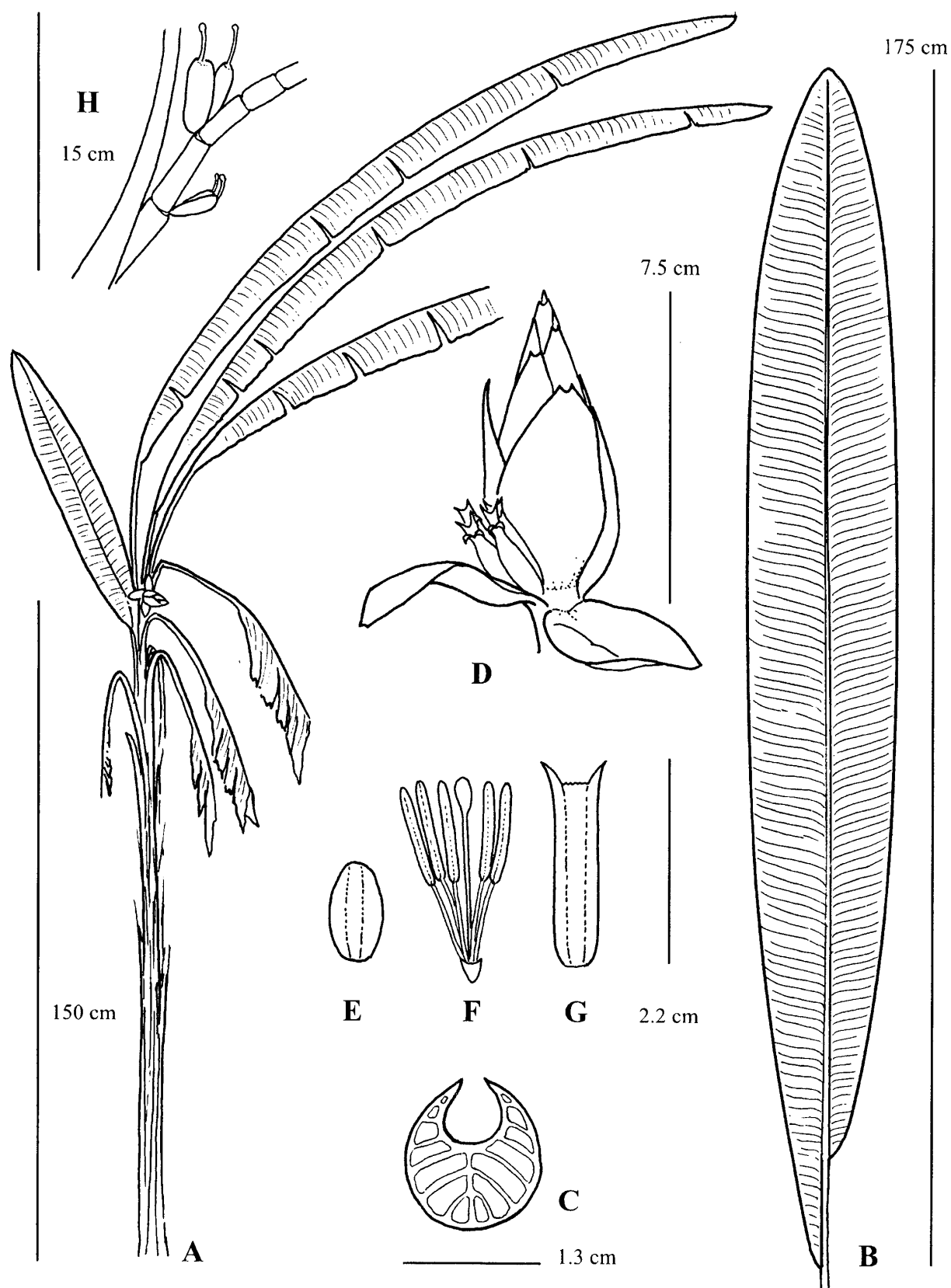


FIG. 1. Drawings of *Musa azizii* [A-H (*M. Häkkinen* MK 998)]. A: The whole plant including pseudostem, inflorescence and leaves. B: Leaf. C: Cross-section of petiole. D: Male bud. E: Free tepal of male flower. F: Stamens and pistil. G: Compound tepal of male flower. H: Lower part of inflorescence with first sterile bract, ovules (unpollinated fruits), pollinated unripe fruits on the rachis.

The descriptive terms here also follow the tradition of banana taxonomy as used by Simmonds (Simmonds 1962, 1966). Relevant parts of the specimens were deposited as a holotype at the herbarium of the Sarawak Forest Department herbarium Sarawak (SAR) and isotype at the herbarium of Universiti Malaysia Sarawak (HUMS). The complete descriptor list is available at University of Helsinki, Finland, as well as at the aforementioned centre.

***Musa azizii* Häkkinen, sp. nov., Figs. 1, 2.**

Plantae parvae cum surculis usque ad 4, non caespitosae, sub arboribus altioribus tantum crescentes; laminis viridibus exerceis, 175 cm longis, 26 cm latis, ad basin cuneatis; inflorescentia parva pendula interdum leviter arcuata prope apicem, pedunculo breve pubescentissimo; fructuum racemo modice laxo, fasciculis basalibus 2 - 3 et fructibus plerumque 1 - 2 in quoque fasciculo, quoque fructu sursum extendente secus rachin, 4 cm longo circiter 0.5 cm in diametro, leviter porcato trigono; gemma



FIG. 2. Photos of *Musa azizii* [A-C (M.Häkkinen MK 998)]. A: Male bud, male flowers, persistent bracts and part of petiole showing petiole canal. B: Horizontal male bud, new and shriveled male flowers from separated bracts, unripe fruits and 1st sterile bract. C: Universiti Malaysia Sarawak student holding the *Musa azizii* plant, which was cut from under story growth behind the holder.

mascula ovoidea, bracteis imbricatis roseo-purpureis apice flavovirentibus obtusis, duabus vel pluribus simul assurgentibus.

*Type:* MALAYSIA. Sarawak. Kapit Division, Lumut range. 1507 ft. alt., latitude 02°45.243' N., longitude 112°45.220' E., May 7, 2004. *M. Häkkinen and K. Meekiong.* MK 998 (Holotype SAR, isotype HUMS).

*Plant* suckering freely, clumping close to parent plant, normally 3 - 4 suckers, position vertical. Mature pseudostem slender up to 1.5 m high, diameter at base 5 - 7 cm, underlying colour red purple, appearance shiny, sap watery (Fig. 1A.). *Petiole* yellow green, with small brown blotches, petiole 55 cm long, petiole canals margins curved inwards with narrow pink-purple to red margins, winged and clasping the pseudostem (Fig. 1C). *Leaf* habit semi-erect, lamina 175 cm long, 26 cm wide, colour of upper surface green, lower surface light green, appearance shiny, without wax on either surface, leaf bases asymmetric and both sides pointed, with a slightly corrugated lamina, midrib dorsally green, ventrally yellow (Figs. 1B, 2C). *Inflorescence* first erect then horizontal, peduncle 8 cm long, 1.5 cm wide, slightly hairy and watery green in colour, first bract sterile usually 1 with narrow and short foliage lamina, 20 cm long, base broadened, pink purple, usually persistent at the opening of the female flowers (Fig. 2B). *Female flowers* on basal 2 or 3 nodes 1 - 2 per bract, in a single row, ovary 1.8 cm long, light green, arrangement of ovules in two rows per loculus, compound tepal 2.0 cm long, free tepal oval, 1.2 cm long, style 2.0 cm long persistent (Figs. 1H, 2B). *Male bud* ovoid, 7.5 cm long, 3.5 cm wide, bracts imbricate, apex obtuse, tinted with light green, dorsally red-purple, with discoloured lines, ventrally whitish, colour fading towards the base, bract scars very prominent on rachis, several bracts lifting at a time, not revolute and persistent, with very few wax and moderate grooves (Figs. 1D, 2A). *Male flowers*, 4 - 6 per bract in two rows,

watery green, lobes green, falling before the bract, compound tepal 2.2 cm long, light green, without pigmentation, apex little developed, outer lobes ovate, cuspidate, free tepal 1.4 cm long, translucent white, oval nearly rounded, rotundate and simple folding under apex, fertile stamens 5, filaments 0.8 cm long, anthers 1 cm, same level, watery green, sterile pistil as long as stamens, style white in color, stigma yellow, ovary 3 mm, long arched watery green, without pigmentation (Figs. 1E-G, 2B). *Fruit* bunch rather lax, erect with 2 hands and 1 - 2 fruits per hand, fingers pointed upwards, 4 cm long, 5 mm in diameter, pronounced ridged, apex rounded, pedicel 3 mm long, glabrous, immature fruit peel light green, pulp white before maturity, base of style prominent (Figs. 1H, 2B). *Seeds* 20 - 30 per fruit, depressed obpyriform, very small, similar to seeds of *Musa suratii* in shape and size (Häkkinen 2004).

*Notes:* *Musa azizii* with unique characters does not have any similar species in the genus *Musa*, which suggests that *M. azizii* is not likely to be a natural hybrid. Chromosome numbers were not counted.

*Musa azizii* is named in honour of Chairman of Sarawak Biodiversity Council Datuk Amar Haji Abdul Aziz Haji Husain for his work to save the heritage of Sarawak biodiversity for coming generations.

*Musa azizii* population was observed at 500 meters above sea level in the Lumut Range Sarawak. This population was also strange to the local people and no other populations were found even after making extensive studies in the area. Several *Musa* species such as *M. acuminata* Colla of the sect. *Eumusa*, *M. borneensis*, *M. hirta* and *M. muluensis* of the sect. *Callimusa* grew in the surrounding area. There are no obvious topographic boundaries that separate for these areas of growth. The studied areas have a humid equatorial climate and an annual rainfall of 4000 - 7000 mm (Hazebroek & Morshidi 2001) and the climates in the

aforementioned regions are all very similar. *Musa azizii* cannot grow in open exposure; in such conditions it may very soon shrivel and die (Hotta 1987).

Biodiversity is very rich in Borneo and new *Musa* species can still be found. On the other hand, it is expected that *M. azizii*, which is an extremely rare species, would become extinct.

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